DEC 6 1971

SOUTHWESTERN STATES (R-3)[1/]

1/ Includes all forested lands in Arizona and New Mexico and National Park Service land in southern Colorado and western Texas.

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Conditions in Brief

Forest disease problems receiving the greatest attention in 1971 were air pollution and the dwarf mistletoes. A Region-wide detection survey was conducted for air pollution-caused forest diseases. For the dwarf mistletoes, emphasis was again placed upon incorporation of preventive measures into the management of timber stands and recreation areas.

Status of Diseases

Air pollution. In 1971, a Region-wide detection survey was conducted for air pollution-caused forest diseases. Thirty-five areas in National Parks, National Monuments, National Forests, and Indian Reservations were surveyed. Some of the areas were located where major air pollution sources now exist. Others were in areas where major sources will exist in the near future.

Trees in all of the surveyed areas were examined for symptoms of acute sulfur dioxide injury. Symptoms typical of acute injury were observed in only two areas. One of the areas was within 4 miles of the copper smelter at Miami, Ariz. The other was within 4 miles of the copper smelter at Morenci, Ariz. Symptoms resembling chronic injury were observed in several areas.

Dwarf mistletoes, Arceuthobium spp., are the most widespread and destructive disease agents in the forest lands of the Southwest. Of the eight dwarf mistletoes that occur in this area, Arceuthobium vaginatum (Willd.) Presl. subsp. cryptopodum (Engelm.) Hawks. and Wiens, which occurs on ponderosa pine and Apache pine, is the most important. A. douglasii Engelm., on Douglas-fir, is next in importance. The six other dwarf mistletoes that occur in the Southwest are of local importance. Annual losses caused by A. vaginatum subsp. cryptopodum may exceed 150 MM bd. ft.

Control is being achieved largely through preventive measures which are incorporated into silvicultural treatments. Preventive measures being used include cleaning infected trees from stands during seed-tree cutting and harvesting poor-risk infected trees during intermediate cutting. The 6-class mistletoe rating system is being used to determine risk.

Dwarf mistletoe-infected trees have been pruned and selectively cut in some recreation areas. Pruning is expected to enhance tree vigor in these high-value areas. Selective cutting provided for removal of infected overstory trees where stocking of desirable leave trees was adequate.

Winter injury. From January 3 to 8, 1971, temperatures in the Southwest were extremely low. The weather station at Hawley Lake, Ariz., for example, reported a record low of minus 40° F. Reports of injured trees were later received from several areas in both New Mexico and Arizona. Ponderosa pine and pinyon pine seedlings and saplings in canyon bottoms and other frost-pocket areas were seriously affected. However, little permanent damage seems to have occurred. Recovery of severely injured trees in some localized areas was hampered by drought conditions.

Armillaria root rot, Armillaria mellea (Vahl.) Quel., has been found in four ponderosa pine plantations in central New Mexico, and has caused serious mortality in one.2/ The disease has also been found in one plantation in Arizona. Surveys are being conducted in plantations throughout the Southwest to determine the impact of this disease.

2/ M. J. Weiss and J. W. Riffle. Armillaria root rot in a ponderosa pine plantation in New Mexico. Plant Dis. Reporter 55(9): 823-824, 1971.

Texas root rot, Phymatotrichum omnivorum (Shear) Dugg., continued to be a problem at Big Bend National Park, Texas. Cottonwood cuttings imported from an eastern nursery, and planted on approximately 300 acres of old farmland, proved to be extremely susceptible to this disease. More than 100 trees have died each year for the last 3 years. Less susceptible species are being planted where the root rot is a problem.

Verticicladiella root rot, Verticicladiella wageneri Kend., caused damage to pinyon pine at Mesa Verde National Park, Colorado. Local infection centers remained active, killing numbers of trees.

Red rot, Polyporus anceps Pk., is the major cause of defect in ponderosa pine in the Southwest. It accounts for losses of 15 to 25 percent of the gross sawtimber volume harvested from virgin stands.3/ In second-growth stands, losses are rarely below 5

3/ C. O. Lindh. Ponderosa pine in the Southwest. USDA Yearbook 1949: 347-352.

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percent in a 150-year rotation, but may be reduced to $2\frac{1}{2}$ percent if trees are cut when 120 years old.4/ Losses are being reduced

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4/ S. R. Andrews. Red rot of ponderosa pine. USDA, Forest Service, Agr. Monograph No. 23, 1955.

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primarily through silvicultural and timber management practices.

Other diseases. Aspen in the Southwest, as elsewhere, is extremely prone to disease problems. Several cankers occur, including Hypoxylon canker, Hypoxylon pruinatum (Klotzsch.) Cke., and sooty-bark canker, Cenangium singulare (Rehm.) Davids. & Cash. Both diseases have caused mortality losses in recreation areas. Fomes applanatus (Pers. ex S. F. Gray) Gill, is an important cause of root and butt rot. This disease has frequently contributed to windthrow.

Limb rust, Peridermium filamentosum Pk., caused scattered mortality in ponderosa pine. Spruce broom rust, Chrysomyxa arctostaphyli Diet., and fir broom rust, Melampsorella caryophyllacearum Schroet., are important in recreation areas where they are associated with bole deformation, spiketop, and mortality. No direct control is being undertaken. Land managers are encouraged to reduce losses by removing risk trees during normal intermediate cuttings.

Needle cast of ponderosa pine was at an endemic level in 1971. The three needle cast fungi which have caused spectacular injury in the past are: Elytroderma deformans (Weir) Dark., Davisomycella ponderosae (Staley) Dubin, and Lophodermella cerina (Dark.) Dark.